

REMARKS

This amendment is submitted in Response to the outstanding Office Action dated July 21, 2008. The Office Action has been reviewed, and reconsideration of the application and allowance thereof are requested based on the following remarks.

The objection to Claim 15 has been considered. "A tile buffer" has been amended to "the tile buffer." Therefore, withdrawal of the objection is respectfully requested.

The specification has also been amended in order to include the appropriate headings. No new matter has been added.

Applicant hereby cancels Claims 17-22 and 24-25, amends Claims 14-16 and 23, and adds new Claims 26-29. Applicant submits that all of pending Claims 14-16, 23 and 26-29 are in condition for allowance.

Claims 14-16 and 23 have been amended to particularly point out and distinctly claim the subject matter which Applicant regards as the invention, or to cure grammatical and idiomatic errors contained therein. In addition, Claims 14 and 23 incorporate the subject matter of cancelled Claims 20 and 25, respectively. New Claim 26 recites, "the filtering means includes a box filter," which is fully supported by page 4 of the Specification. New Claim 27 includes "the step of storing the texture data associated with the image to be shielded in the system main memory before generating the mipmap chain of the texture images," which is fully supported by page 9 of the Specification. New Claim 28 includes "means for overwriting a preceding level of the mipmap data in the tile buffer with a succeeding level of the mipmap data," which is fully supported by page 5 of the specification. New Claim 29 includes "the step of overwriting a preceding level of the mipmap data in the tile buffer with a succeeding level of the mipmap data," which is also fully supported by page 5 of the specification. No new matter has been added.

Claims 14-25 stand rejected under 35 USC §103(a), as being unpatentable over Sanz-Pastor et al., U.S. Patent No. 6,747,649 B1, in view of Ephanov, U.S. Patent No. 6,924,814 B1. Applicants respectfully traverse this ground of rejection and urge that the presently claimed invention is patentably distinguishable over the prior art cited by the Examiner.

Claim 14 is now directed to an apparatus for generating automatically a mipmap chain of texture images from a portion of texture image data for use in texturing a computer graphic image in a tile based rendering system comprising:

- means for supplying texture data;
- means for allocating the texture data to at least one tile;
- means for storing the texture data allocated to each tile in a tile buffer;
- means for filtering the texture data in the tile buffer for each data and generating at least one lower level of mipmap data from the texture data;
- means for temporarily storing each lower level of the mipmap data in the tile buffer; and
- means for storing each lower level of the mipmap data in a system main memory,

wherein the filtering means and the temporarily storing means generate a predetermined number of mipmap levels to form the mipmap chain of the texture images.

In contrast, Sanz-Pastor teaches a method for rendering terrain, the terrain having at least one level of detail, the method comprising:

- retrieving a plurality of vertices from a scene database, each vertex associated with at least one level of detail of the terrain;
- organizing the retrieved vertices into a plurality of layers, each layer centered about a viewer;
- applying a texture to each of the plurality of layers; and
- rendering the layers.

Sanz-Pastor also teaches an image generator, and discloses that the texture map in the database is arranged into tiles. However, Sanz-Pastor does not teach allocating the texture data to the tiles.

As for the storing the texture data, Sanz-Pastor discloses column 11, lines 42-46 that vertices are extracted from the tile assembly buffer 1104 and inserted into sector vertex buffer 1106, which stores all the vertices required to render each sector of the layer, rather than storing the texture data allocated to each tile in a tile buffer.

As for the filtering means, Sanz-Pastor discloses column 14, lines 36-39 that levels of detail are generated by filtering the simulated sea geometry into progressively sparser meshes, and that this filtering process occurs for each time-step of the simulation. Thus, Sanz-Pastor teaches the simulation of sea, which is a moving body. In addition, the filtering of the simulated sea geometry is different from the filtering the texture data in the present invention. Rather, Sanz-Pastor's filtering process performs filtering the geometry onto which the texture is to be applied. In column 14, lines 52-55, Sanz-Pastor discloses the creation of new meshes and texture maps as time progresses according to environmental parameters. Thus, Sanz-Pastor teaches changing the texture rather than the derivation of the mipmap chain of data from the initial texture.

As for the temporarily storing step, Sanz-Pastor discloses in column 13, lines 3-6 that because each layer texture is a MIP-map, each layer must obtain texels from multiple texture levels via tile assembly buffer 1206. However, Sanz-Pastor does not teach temporarily storing each lower level of the mipmap data in the tile buffer.

The Examiner admits that Sanz-Pastor does not explicitly teach the means for storing each lower level of the mipmap data in a system main memory, and cites Ephanov so as to allegedly cure the deficiencies.

Ephanov teaches a method of simulating clip texturing. Ephanov also discloses in column 4, lines 55-60 that a memory system 16 may include a texture memory system 34 which may or may not be separate from a main memory 30, and that the texture memory system 34 may be a portion of the main memory 16 dedicated to texturing processes or it may be a separate memory system from the main memory 16. However, although Ephanov discloses the main memory system, Ephanov does not teach the means for storing each lower level of the mipmap data in a system main memory. Ephanov does not show using the tile buffer for temporary storage of the texture image of the mipmap chain when it is generated.

Moreover, Ephanov as well as Sanz-Pastor does not disclose the additional limitation of Claim 14 that the filtering means and the temporarily storing means generate a predetermined number of mipmap levels to form the mipmap chain of the texture images. The present invention uses a suitably sized portion of memory - the tile buffer - onto which the texture image data may be written and repeatedly filtered to generate the mipmap chain with each level stored in the main memory when it is generated, for subsequent use in rendering the image.

There would be no motivation whatsoever to combine Ephanov's memory with Sanz-Pasotor's system, since Sanz-Pastor also includes the buffers to store data.

Accordingly, Claim 14 is believed to be patentably distinguishable over Sanz-Pastor and Ephanov, alone or in combination with one another.

Claim 23 is directed to a method corresponding to the apparatus of Claim 14, and, therefore, is believed to be allowable over Sanz-Pastor and Ephanov for the same reasons as presented above relative to Claim 14.

Claims 15-16 depend upon what is believed to be an allowable Claim 14, and as such, are believed allowable therewith. These claims also include additional features which further distinguish over Sanz-Pastor and Ephanov. For

example, Claim 15 further discloses that the tile buffer is used for temporarily storing image data prior to writing it to a frame buffer. Claim 16 discloses that the frame buffer comprises a portion of the main memory. As discussed above, Sanz-Pastor does not disclose storing the image data in a tile buffer, although Sanz-Pastor teaches the sector vertex buffer 1106 for storing all the vertices to render each sector of the layer.

New Claims 26 and 28 depend upon what is believed to be an allowable Claim 14, and as such, are believed allowable therewith. Also, new Claims 27 and 29 depend upon what is believed to be an allowable Claim 23, and as such, are believed allowable therewith. Claim 26 further discloses that the filtering means includes a box filter. Neither Sanz-Pastor nor Ephanov teaches the box filter.

Claim 27 discloses that the step of storing the texturing data associated with the image to be shielded in the system main memory before generating the mipmap chain of the texture images. As discussed above, Sanz-Pastor and Ephanov do not teach even storing the texturing data in the system main memory or generating the mipmap chain of the texture images.

Claims 28 and 29 disclose the means for, or the step of, overwriting a preceding level of the mipmap data in the tile buffer with a succeeding level of the mipmap data. Sanz-Pastor and Ephanov do not teach the overwriting means for different levels of the mipmap data.

For the above reasons allowance of Claims is respectfully requested. Further and favorable reconsideration is respectfully requested.

Respectfully submitted,


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